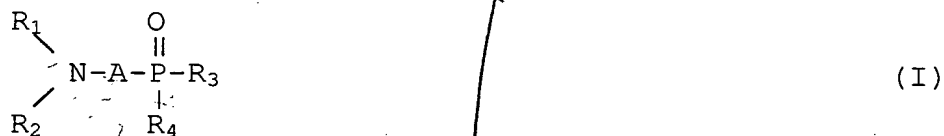


Patent Claims

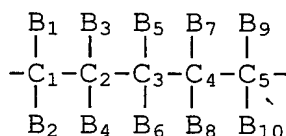
1. Organophosphorus compounds of the general formula (I)



in which R₁ and R₂ are identical or different and are selected from the group which consists of hydrogen, substituted and unsubstituted C₁₋₉ alkyl, substituted and unsubstituted hydroxy-C₁₋₉-alkyl, substituted and unsubstituted C₁₋₉ alkenyl, substituted and unsubstituted C₁₋₉ alkynyl, substituted and unsubstituted aryl, substituted and unsubstituted acyl, substituted and unsubstituted cycloalkyl, substituted and unsubstituted aralkyl, substituted and unsubstituted heterocyclic residue, halogen, OX₁ and OX₂,

wherein X₁ and X₂ may be identical or different and are selected from the group which consists of hydrogen, substituted and unsubstituted C₁₋₉ alkyl, substituted and unsubstituted hydroxy-C₁₋₉-alkyl, substituted and unsubstituted C₁₋₉ alkenyl, substituted and unsubstituted C₁₋₉ alkynyl, substituted and unsubstituted aryl, substituted and unsubstituted acyl, substituted and unsubstituted cycloalkyl, substituted and unsubstituted aralkyl, substituted and unsubstituted heterocyclic residue,

in which A is of the following formula (II):



wherein one or more of the carbon atoms selected from the group C₃, C₄, C₅ together with their substituents may also be absent, and at least one substituent present in the range from B₁ to B₁₀ is a C₃₋₈-cycloalkyl-(C₀₋₉)-alkyl group, wherein both the C₃₋₈ cycloalkyl group and the C₀₋₉ alkyl group may comprise one or more double bonds and one or two carbon atoms of the cycloalkyl group may be replaced by nitrogen, oxygen or sulfur atoms, and wherein both the cycloalkyl group and the alkyl group may be substituted with hydroxy, halogen, amino, oxo groups with branched or unbranched C₁₋₉ alkyl groups and C₂₋₉ alkenyl groups, wherein the C₁₋₉ alkyl groups and C₂₋₉ alkenyl groups may be substituted with hydrogen, hydroxy, amino, halogen and oxo groups, and

the remaining substituents B₁ to B₁₀ present are selected from the group which consists of hydrogen, hydroxy, halogen, amino groups, C₁₋₂₆ alkyl residues, C₁₋₂₆ alkoxy residues, C₁₋₂₆-alkoxy-C₁₋₂₆-alkyl residues or both substituents of a C atom together form an oxo group, wherein each C₁₋₂₆ alkyl residue and each C₁₋₂₆ alkoxy residue may be branched or unbranched and be saturated or unsaturated with one or more double bonds and may be substituted with hydroxy, amino, halogen and oxo groups,

in which R₃ and R₄ are identical or different and are selected from the group which consists of substituted and unsubstituted C₁₋₂₆ alkyl, substituted and unsubstituted hydroxy-C₁₋₂₆-alkyl, substituted and unsubstituted aryl, substituted and unsubstituted acyl, substituted and unsubstituted cycloalkyl, substituted and unsubstituted aralkyl, substituted and unsubstituted C₁₋₂₆ alkenyl, substituted and unsubstituted C₁₋₂₆ alkynyl, substituted and unsubstituted cycloalkyl, substituted and unsubstituted heterocyclic residue, halogen, OX₃ and OX₄,

wherein X₃ and X₄ are identical or different and consist of hydrogen, substituted and unsubstituted C₁₋₂₆ alkyl, substituted and unsubstituted hydroxy-C₁₋₂₆-alkyl, substituted and unsubstituted aryl, substituted and unsubstituted aralkyl, substituted and unsubstituted C₁₋₂₆ alkenyl, substituted and unsubstituted C₁₋₂₆ alkynyl, substituted and unsubstituted cycloalkyl, substituted and unsubstituted heterocyclic residue, a silyl, a cation of an organic and inorganic base, in particular a metal of main groups I, II or III of the periodic system, ammonium, substituted ammonium and ammonium compounds derived from ethylenediamine or amino acids, and the pharmaceutically acceptable salts, esters thereof and salts of the esters.

2. Compound according to claim 1, characterised in that the organophosphorus compounds are of the formula (II)



wherein

wherein X₁ is hydrogen and R₂ an acyl residue, particularly preferably a formyl residue or acetyl residue, and R₃, R₄ and A have the same meaning as in formula (I).

3. Compound according to claim 1 or claim 2, characterised in that X₃ and X₄ are selected from the group which consists of OX₃ and OX₄, and X₃ and X₄ are selected from the group comprising hydrogen, a metal of main groups I, II or III of the periodic system,

ammonium, substituted ammonium, or ammonium compounds derived from ethylenediamine or amino acids.

4. Compound according to one of the preceding claims, characterised in that the carbon chain of A with the formula (II) consists of three carbon atoms C₁, C₂, C₃.
5. Compound according to one of claims 1 to 3, characterised in that B₁ and B₂ together or B₇ and B₈ together form an oxo group and the carbon chain in A consists of four carbon atoms C₁, C₂, C₃, C₄.
6. Compound according to one of claims 1 to 3, characterised in that the carbon chain of A with the formula (II) consists of four carbon atoms C₁, C₂, C₃, C₄ and B₇ or B₈ or both are a hydroxy group.
7. Compound according to one of claims 1 to 3, characterised in that the carbon chain preferably consists of 5 carbon atoms C₁, C₂, C₃, C₄, C₅, wherein B₁ and B₂ together form an oxo group and B₉ or B₁₀ are a hydroxyl group or B₉ and B₁₀ together also form an oxo group.
8. Compound according to claim 6 or claim 7 dependent upon claim 1 or 2, characterised in that R₃ or R₄ or both are methylene groups.
9. Use of organophosphorus compounds according to one of claims 1 to 8 for the treatment of infectious processes in humans and animals which are caused by viruses, bacteria, fungi or parasites and as a fungicide, bactericide or herbicide in plants.
10. Use according to claim 9 for the treatment of infections caused by bacteria, viruses, fungi or uni- or multicellular parasites.
11. Use according to claim 10 for the treatment of infections which are caused by bacteria which are selected from the group which consists of bacteria of the family Propionibacteriaceae, in particular of the genus Propionibacterium, in particular the species Propionibacterium acnes, bacteria of the family Actinomycetaceae, in particular of the genus Actinomyces, bacteria of the genus Corynebacterium, in particular the species Corynebacterium diphtheriae and Corynebacterium pseudotuberculosis, bacteria of the family Mycobacteriaceae, of the genus Mycobacterium, in particular the species Mycobacterium leprae, Mycobacterium tuberculosis, Mycobacterium bovis and Mycobacterium avium, bacteria of the family Chlamydiaceae, in particular the species Chlamydia trachomatis and Chlamydia psittaci, bacteria of the genus Listeria, in

particular the species *Listeria monocytogenes*, bacteria of the species *Erysipelthrix rhusiopathiae*, bacteria of the genus *Clostridium*, bacteria of the genus *Yersinia*, the species *Yersinia pestis*, *Yersinia pseudotuberculosis*, *Yersinia enterocolitica* and *Yersinia ruckeri*, bacteria of the family *Mycoplasmataceae*, of the genera *Mycoplasma* and *Ureaplasma*, in particular the species *Mycoplasma pneumoniae*, bacteria of the genus *Brucella*, bacteria of the genus *Bordetella*, bacteria of the family *Neisseriaceae*, in particular of the genera *Neisseria* and *Moraxella*, in particular the species *Neisseria meningitidis*, *Neisseria gonorrhoeae* and *Moraxella bovis*, bacteria of the family *Vibrionaceae*, in particular of the genera *Vibrio*, *Aeromonas*, *Plesiomonas* and *Photobacterium*, in particular the species *Vibrio cholerae*, *Vibrio anguillarum* and *Aeromonas salmonicidas*, bacteria of the genus *Campylobacter*, in particular the species *Campylobacter jejuni*, *Campylobacter coli* and *Campylobacter fetus*, bacteria of the genus *Helicobacter*, in particular the species *Helicobacter pylori*, bacteria of the families *Spirochaetaceae* and *Leptospiraceae*, in particular of the genera *Treponema*, *Borrelia* and *Leptospira*, in particular *Borrelia burgdorferi*, bacteria of the genus *Actinobacillus*, bacteria of the family *Legionellaceae*, of the genus *Legionella*, bacteria of the family *Rickettsiaceae* and family *Bartonellaceae*, bacteria of the genera *Nocardia* and *Rhodococcus*, bacteria of the genus *Dermatophilus*, bacteria of the family *Pseudomonadaceae*, in particular of the genera *Pseudomonas* and *Xanthomonas*, bacteria of the family *Enterobacteriaceae*, in particular of the genera *Escherichia*, *Klebsiella*, *Proteus*, *Providencia*, *Salmonella*, *Serratia* and *Shigella*, bacteria of the family *Pasteurellaceae*, in particular of the genus *Haemophilus*, bacteria of the family *Micrococcaceae*, in particular of the genera *Micrococcus* and *Staphylococcus*, bacteria of the family *Streptococcaceae*, in particular of the genera *Streptococcus* and *Enterococcus* and bacteria of the family *Bacillaceae*, in particular of the genera *Bacillus* and *Clostridium*, and in the eradication of *Helicobacter* in ulcers of the gastrointestinal tract.

12. Use according to claim 10 for the treatment of infections which are caused by viruses which are selected from the group which consists of viruses of the genus *Parvoviridae*, in particular parvoviruses, dependoviruses, densoviruses, viruses of the genus *Adenoviridae*, in particular adenoviruses, mastadenoviruses, aviadenoviruses, viruses of the genus *Papovaviridae*, in particular papovaviruses, in particular papillomaviruses ("wart" viruses), polyomaviruses, in particular JC virus, BK virus and miopapovaviruses, viruses of the genus *Herpesviridae* in particular herpes simplex viruses, varicella-zoster viruses, human cytomegalovirus, Epstein-Barr viruses, human herpesvirus 6, human herpesvirus 7, human herpesvirus 8, viruses of the genus *Poxviridae*, in particular poxviruses, orthopoxviruses, parapoxviruses, molluscum contagiosum virus, aviviruses, capriviruses, leporipoxviruses, primarily hepatotropic

viruses, in particular hepatitisviruses, such as hepatitis A viruses, hepatitis B viruses, hepatitis C viruses, hepatitis D viruses, hepatitis E viruses, hepatitis F viruses, hepatitis G viruses, hepadnaviruses, in particular all hepatitisviruses, such as hepatitis B virus, hepatitis D viruses, viruses of the genus Picornaviridae, in particular picornaviruses, all enteroviruses, all polioviruses, all coxsackie-viruses, all echoviruses, all rhinoviruses, hepatitis A virus, aphthoviruses, viruses of the genus Calciviridae, in particular hepatitis E viruses, viruses of the genus Reoviridae, in particular reoviruses, orbiviruses, rotaviruses, viruses of the genus Togaviridae, in particular togaviruses, alphaviruses, rubiviruses, pestiviruses, rubellavirus, viruses of the genus Flaviviridae, in particular flaviviruses, FSME virus, hepatitis C virus, viruses of the genus Orthomyxoviridae, in particular all influenza viruses, viruses of the genus Paramyxoviridae, in particular paramyxoviruses, morbillivirus, pneumovirus, measles virus, mumps virus, viruses of the genus Rhabdoviridae, in particular rhabdoviruses, rabies virus, lyssavirus, vascular stomatitisvirus, viruses of the genus Coronaviridae, in particular coronaviruses, viruses of the genus Bunyaviridae, in particular bunyaviruses, nairovirus, phlebovirus, uukuvirus, hantavirus, hantaan virus, viruses of the genus Arenaviridae, in particular arenaviruses, lymphocytic choriomeningitis virus, viruses of the genus Retroviridae, in particular retroviruses, all HTLV viruses, human T-cell leukaemia virus, oncornaviruses, spumaviruses, lentiiviruses, all HI viruses, viruses of the genus Filoviridae, in particular Marburg and Ebola virus, slow-viruses, prions, ~~onc~~oviruses and leukaemia viruses.

13. Use according to claim 10 for the prevention and treatment of infections caused by unicellular parasites, namely the causative organisms of malaria, sleeping sickness, Chagas' disease, toxoplasmosis, amoebic dysentery, leishmaniasis, trichomoniasis, pneumocystosis, balantidiasis, cryptosporidiosis, sarcocytosis, acanthamoebosis, naeglerosis, coccidiosis, giardiasis and lambliasis.

add
B'